

CLAIMS

1. A control system for controlling the movement of a piston (10) in a fluid-pumping device (1), the piston (10) being displaceable in a block (5) of the fluid-pumping device (1) and being driven by a motor (2) fed by a voltage (V), the system comprising:
- a semiconductor electronic device (T) having an outlet (S_e) and an inlet (G), the semiconductor electric device (T) cyclically applying the voltage (V) to the motor (2) to drive the piston (10);
 - a resistive element (R_b);
 - a capacitive element (C_y);
 - a piston-position sensor (S) to indicate the passage of the piston (10) by a point (R) at the block (5) of the fluid-pumping device (1); and the system being characterized by:
 - the capacitive element (C_y) being electrically connected to the semiconductor device (T) between and re-feeding the outlet (S_e) and the inlet (G), the capacitive element (C_y) triggering the semiconductor electronic device (T) to apply the voltage (V) to the motor (2);
 - the capacitive element (C_y) being charged by means of the resistive element (R_b) at each cycle of application of voltage (V) to the motor (2), the capacitive element (C_y) being discharged, at least partly, when the piston (10) passes by the point (R) and delaying the trigger point of the semiconductor electronic device (T) in a subsequent cycle proportionally to the time of passage of the piston (10) by the point (R).
2. A control system according to claim 1, characterized in that the semiconductor electronic device (T) is self-fed by the voltage (V).
3. A control system according to claim 1, 2, or 3, characterized by additionally comprising a triggering semiconductor electronic device (T₁) electrically connected with the inlet (G) and with the capacitive element (C_y) and resistive element (R_b).
4. A control system according to any one of claim 1 to 3, characterized in that the electronic device comprises a bidirectional power switch

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(T).

5. A control system according to any one of claim 1 to 4, characterized in that the sensor (S) is electrically connected with the entry (G) of the device (T).

5 6. A control system according to claim 5, characterized in that the device (T) is actuated by a semiconductor electronic device (T1).

7. A control system according to claim 6, characterized in that the position sensor (S) includes a contact element (Sp) for contact with the piston (10).

10 8. A control system according to claim 7, characterized in that the position sensor (S) includes an inductive element (Li).

9. A control system according to claim 8, characterized in that the inductive element (Li) is electrically connected with a semiconductor device (T2).

15 10. A method of controlling the movement of a piston (10) in a fluid-pumping device (1), the piston (10) being displaceable in a block (5) of the fluid-pumping device (1) and being driven by a motor (2) fed by a voltage (V), the method comprising the steps of:

20 - charging a capacitive element (Cy) by means of a resistive element (Rb),
- monitoring the movement of the piston (10) by means of a position sensor (Sp, Li), and
the method being characterized by:

25 - maintaining the charge level of the capacitive element (Cy) until the position sensor (Sp, Li) has detected the passage of the piston (10) by a predetermined point (R) at the block (5), and discharging, at least partly, the capacitive element (Cy).

11. A method according to claim 10, characterized in that, after the step of discharging, the capacitive element (Cy) is again charged.

30 12. A method according to claim 10 or 11, characterized in that, in the step of monitoring the movement of the piston (10), a contact element (Sp) is actuated.

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13. A method according to claim 10 or 11, characterized in that, in the monitoring step, an inductive element (Li) is actuated.

14. A fluid-pumping device (1) comprising a piston (10) displaceable in a block (5), the piston (10) being driven by a motor (2) fed by a voltage (V), and comprising a circuit (30, 40) having a semiconductor electronic device (T), a resistive element (R_B), a capacitive element (Cy) and a piston-position sensor (S) to indicate the passage of the piston (10) by a point (R) at the block (5);
the device (1) being characterized by comprising:

- 10 - the resistive element (R_B) and the capacitive element (Cy) being electrically connected with the semiconductor electronic device (T), re-feeding an outlet and an inlet (G) of the latter;
- the capacitive element (Cy) being charged by means of the resistive element (R_B) and being discharged, at least partly, when the piston
- 15 (10) passes by the point (R).

15. A device according to claim 14, characterized in that the circuit (30, 40) is self-fed.

16. A device according to claim 14 or 15, characterized in that the electronic device comprises a bidirectional power switch (T).

20 17. A device according to claim 14, 15, or 16, characterized in that the position sensor (S) includes a contact element (Sp) for contact with the piston (10).

18. A device according to claim 14, 15, or 16, characterized in that the position sensor (S) includes an inductive element (Li).